Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 15 (6): 1113–1118
https://doi.org/10.15560/15.6.1113

PENSOFT

First records of *Mimon cozumelae* Goldman, 1914 (Chiroptera, Phyllostomidae) in the Río Plátano Biosphere Reserve in northeastern Honduras

Hefer Daniel Ávila-Palma[1], Manfredo Alejandro Turcios-Casco[2, 3], Danny Josué Ordoñez Bautista[4], Marcio Martínez[5], Diego Iván Ordoñez-Mazier[1]

1 Escuela de Biología, Universidad Nacional Autónoma de Honduras, Boulevard Suyapa, Tegucigalpa, Francisco Morazán, Honduras. **2** Departamento de Vida Silvestre, Instituto Nacional de Conservación y Desarrollo Forestal, Áreas Protegidas y Vida Silvestre, Comayagüela, Francisco Morazán, Honduras. **3** Biological Institute, Tomsk State University, 36 Lenin Ave., Tomsk, Russia. **4** Diseño, Construcción y Medio Ambiente S. de R. L., Distrito Central, Francisco Morazán, Honduras. **5** Región Biosfera del Río Plátano, Instituto Nacional de Conservación y Desarrollo Forestal, Áreas Protegidas y Vida Silvestre, Marañones, Olancho, Honduras.
Corresponding author: Manfredo Alejandro Turcios-Casco, manturcios21@gmail.com

Abstract
Mimon cozumelae Goldman, 1914 is a poorly studied phyllostomid bat with occurrence records in Honduras dating from 17 years ago. During a survey from 13–22 September 2018 in the core of the Río Plátano Biosphere Reserve, northeastern Honduras, we captured two *M. cozumelae* in a sample of 43 individuals recognized in 11 bat species. These records represent the fifth and sixth localities of *M. cozumelae* in the country and the first record since 2001. We recommend that *M. cozumelae* be included in the conservation and management plan of the Río Plátano Biosphere Reserve and in the conservation lists of bats in Honduras.

Keywords
Bats, Colón, Cozumelan Golden Bat, Phyllostominae, spear-nosed bats.

Academic editor: Marcelo Nogueira | Received 14 June 2019 | Accepted 10 December 2019 | Published 20 December 2019

Citation: Ávila-Palma HD, Turcios-Casco MA, Ordoñez Bautista DJ, Martínez M, Ordoñez-Mazier DI (2019) First records of *Mimon cozumelae* Goldman, 1914 (Chiroptera, Phyllostomidae) in the Río Plátano Biosphere Reserve in northeastern Honduras. Check List 15 (6): 1113–1118. https://doi.org/10.15560/15.6.1113

Introduction

Mimon is a genus of Phyllostomidae with two recognized species: *M. bennettii* Gray, 1838 and *M. cozumelae* Goldman, 1914 (Hurtado and Pacheco 2014). While *M. bennettii* is endemic to South America, with two apparently disjunct populations (one in Colombia, Venezuela, northern Brazil, and the Guianas, and other in central and eastern Brazil; Hoppe and Ditchfield 2015), *M. cozumelae* is recorded from southern Mexico to northeastern Colombia (Hurtado and Pacheco 2014). Although there seems to be a consensus that *M. cozumelae* is a valid species (Simmons and Voss 1998; Williams and Genoways 2008; Hurtado and Pacheco 2014), it was previously treated as either a subspecies or a junior synonym of *M. bennettii* (Ortega and Arita 1997) due to some difficulty in separating them morphologically (Gregorin et al. 2008).

Mimon cozumelae is a poorly studied and locally rare member of Phyllostominae (Reid 2009), a subfamily composed by predominantly animalivorous bats

Copyright *Ávila-Palma et al.* This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

(Giannini and Kalko 2004). In Mexico this species has been recorded in dry forests (Winkelmann 1962), but in Central America it is restricted to humid ecosystems on the Caribbean versant (Hurtado et al. 2014). Although categorized as Least Concern by the International Union for the Conservation of Nature (IUCN), in Mexico *M. cozumelae* is listed as threatened [cited as *M. bennettii* by Ceballos (2014)], and the need of further research on its biology has been emphasized (Arroyo-Cabrales et al. 2015). Its diet is known to include scarab beetles, birds (Whitaker and Findley 1980), lizards, katydids (Reid 2009), and fruits of *Citrus* spp. (Lobova et al. 2009). Colonies are composed of approximately 10 individuals, and roosts, mainly in caves, can be shared with other species such as *Carollia perspicillata* Linnaeus, 1758, *Desmodus rotundus* É. Geoffroy, 1810, *Diphylla ecaudata* Spix, 1823, and *Pteronotus mesoamericanus* Smith, 1972 (Ortega and Arita 1997).

Honduras harbors a diverse bat fauna, with at least 111 confirmed species (Medina-Fitoria and Turcios-Casco 2019). *Mimon cozumelae* has been known in the country since the early 1970s (Valdez and LaVal 1971), but only three additional localities have been subsequently found (McCarthy et al. 1993), and the last sampled individual was obtained in 2001 (Dick 2013). Herein, we revise these previous records and provide two new occurrences of *M. cozumelae* in the core of the Río Plátano Biosphere Reserve (RPBR) in northeastern Honduras.

Methods

RPBR is situated in northeastern Honduras, including areas in the departments of Gracias a Dios, Olancho, and Colón (14°57′54″N–16°00′43″N, 085°31′25″W–084° 11′32″W). The area of the protected area is 832,339 ha and has three macrozones recognized according to land management: core, buffer, and cultural (Martínez 2014). From 13–22 September 2018, we surveyed bats in the drainage area of the Río Plátano basin (core zone), which is connected to Río Wuarska, Río Blanco, and Río Malo, in the Municipality of Iriona, Departament of Colón (Table 1; Fig. 1). The annual precipitation is 2800 mm, and the average temperature is 23 °C (Escuela Nacional de Ciencias Forestales 2013). According to the Holdridge Life Zone System (1967), the ecosystem is a very humid subtropical forest (Fig. 2), with a predominant vegetation comprised of platanillos (Heliconiaceae), suitas (Arecaceae), *Ficus* spp. (Moraceae), and *Cecropia peltata* (Urticaceae).

We captured bats with two 12 × 2.5 m mist nets with denier mesh of 35 mm. The mist nets were set at ground level and opened from 17:20 to 01:30 h. Their position at each site was selected based on the surrounding vegetation and topography, and also considered the availability of water bodies and fruiting and flowering plants (Kunz and Kurta 1988). Sampling effort was calculated with the area of the two mist nets times the number of hours the mist nets remained opened for the 10 days (Straube and Bianconi 2002). Two individuals of *M. cozumelae* were captured, and one of them was prepared as voucher according to the guidelines of the use of mammals in wildlife research (Sikes et al. 2019). A 100 g spring scale was used to obtain body mass data from these individuals. The following external measurements [for all of them we followed Srinivasulu et al. (2010), except for the tragus length and width for which we followed Dietz and von Helversen (2005)] were recorded to the nearest 0.01 mm with a digital caliper: forearm length (FA); tibia length (Tib); ear length (E); ear width (EW); thumb length (Th); noseleaf length (LN); tragus length (Tr); tragus width (TrW); calcaneus length (Ca); tail length (T); body length (BH); hindfoot length (HF); third metacarpal length (3mt); length of the third phalanx of digit III (3ph); length of the second phalanx of digit III (2ph); and the length of the first phalanx of digit III (1ph). Skull measurements obtained from the voucher according to Giménez and Giannini (2016) included condylobasal length (CBL), zygomatic breadth (ZB), height of braincase (HB), mastoid breadth (MB), maximum external width between left and right upper molars (WUM), maxillary toothrow length (CM^3), rostrum length (LR), palatal length (LP), upper canine length (LUC), upper canine width (CC), height of mandibular body at lower third premolar (HM), lower canine length (LLC), mandible length (LM), mandibular toothrow (CM_3), and three measurements of the coronoid process (HC1, HC2, HC3). Comparisons and taxonomic identification of *M. cozumelae* were mainly based on Valdez and LaVal (1971), Williams and Genoways (2008), Gregorin et al. (2008), Reid (2009), and Hurtado et al. (2014). We consider *Dermanura* as a distinct genus from *Artibeus* following Van Den Bussche et al. (1993), and we followed

Table 1. New and historical localities of the records of *Mimon cozumelae* in Honduras. These data were used to create an updated distributional map, presented in Figure 1. Geographical coordinates for sites 2 and 3 refer to their respective municipalities, Aguacates and Catacamas.

Site	Department	Locality	Latitude	Longitude	Altitude (m a.s.l.)	Reference
1	Atlántida	Lancetilla	Not given	Not given	41	Valdez and LaVal 1971
2	Colón	Aguacates	15°55′00″N	085°04′00″W	-	McCarthy et al. 1993
3	Olancho	Catacamas	14°53′00″N	085°55′00″W	-	McCarthy et al. 1993
4	Atlántida	Lancetilla	15°27′25″N	087°27′25″W	-	Dick 2013
5	Colón	Wuarska	15°20′24″N	085°15′32″W	418	This study
6	Colón	El Limón	15°22′39″N	085°11′45″W	311	This study

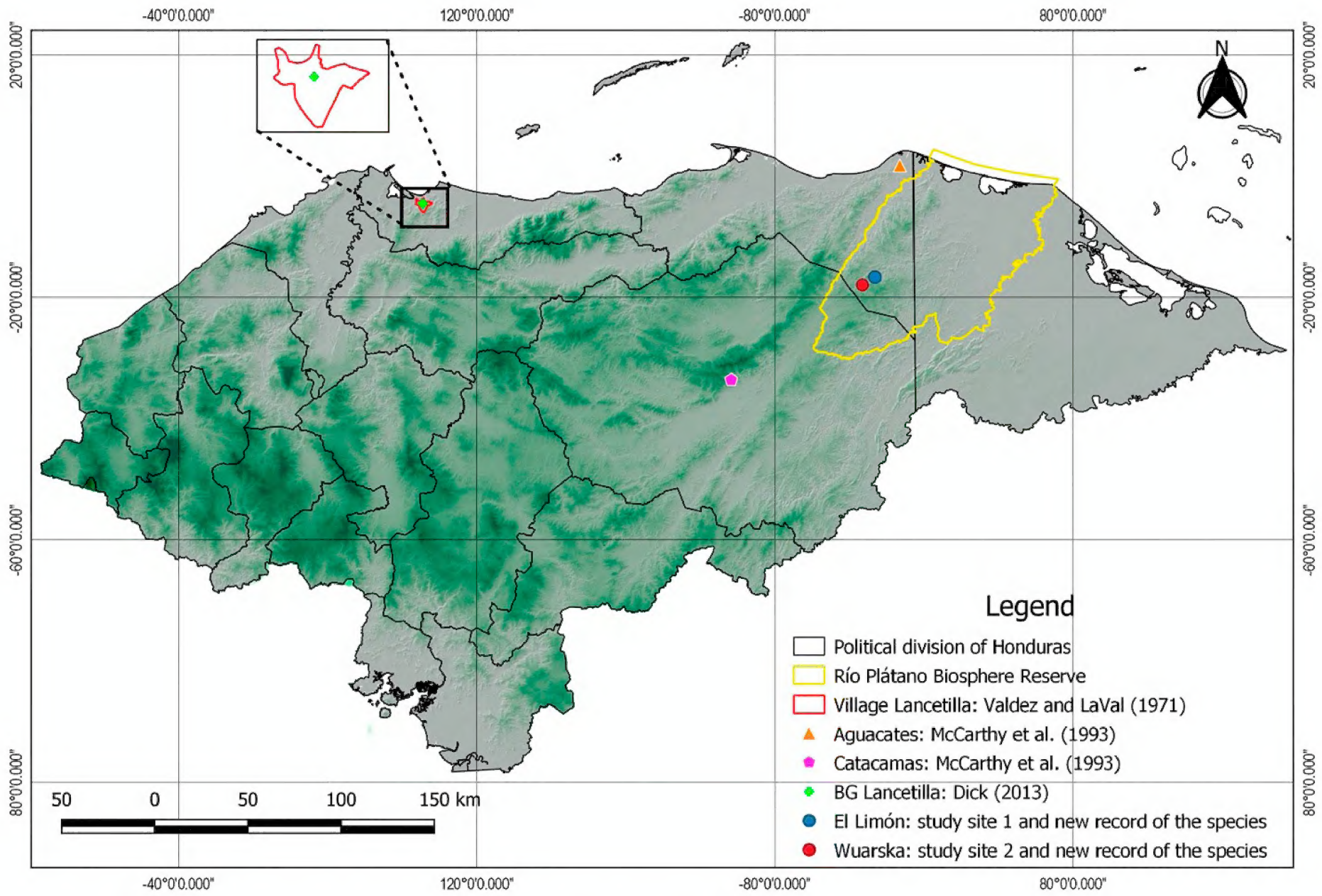

Figure 1. Distribution map of *Mimon cozumelae* in Honduras. Note that the distribution is limited to the northern (Atlántida) and eastern (Olancho and Colón) Honduras. The new records (red and blue circles) are the first for the core of the Río Plátano Biosphere Reserve. In detail, delimited in red, the region of Lancetilla; no further geographic reference is available for the record in Valdez and LaVal (1971). See Table 1 for details of the other records.

Figure 2. Forest with predominance of platanillos (Heliconiaceae), in which the first individual of *Mimon cozumelae* was captured in the core zone of the Río Plátano Biosphere Reserve, Wuarska, Colón.

Gardner (2008) for the taxonomy and nomenclature of the other taxa cited here.

A collecting license was provided by the Región Forestal Biosfera del Río Plátano, of the Instituto Nacional de Conservación y Desarrollo Forestal, Áreas Protegidas y Vida Silvestre (ICF), of which MM and MATC are representatives. All vouchers prepared in our survey were deposited in the collection of the Museum Biodiversidad y Ciencia in the Universidad Nacional Autónoma de Honduras located in the Sula Valley (UNAH-VS), in the Department of Cortés.

Results

In 4860 $m^2 \cdot h$ we captured 43 individuals (0.008 individuals per $m^2 \cdot h$) of 11 species (0.002 species per $m^2.h$) from Phyllostomidae (88.4 % of the captures) and Mormoopidae (11.6% of the captures). In Wuarska we captured 27 individuals of the following species (relative abundance in parentheses): *Pteronotus mesoamericanus* (0.15), *Phyllostomus discolor* Wagner, 1843 (0.11), *Mimon cozumelae* (0.03), *Carollia perspicillata* (0.22), *Carollia castanea* H. Allen, 1890 (0.04), *Dermanura phaeotis* Miller, 1902 (0.03), *Sturnira parvidens* É. Geoffroy, 1810 (0.07), *Centurio senex* Gray, 1842 (0.03), *Desmodus rotundus* (0.26), and *Diphylla ecaudata* (0.03). The list of El Limón included 16 individuals of the following species: *P. mesoamericanus* (0.06), *M. cozumelae* (0.06), *C. perspicillata* (0.56), *Carollia sowelli* Baker, Solari & Hoffmann, 2002 (0.06), *C. castanea* (0.06), and *D. phaeotis* (0.19).

Mimon cozumelae Goldman, 1914

Material examined. HONDURAS, Colón • Río Plátano Biosphere Reserve, Wuarska; 15°20′24″N, 085°15′32″W; 420 m elev.; 16 Sept. 2018; Hefer Daniel Ávila-Palma,

Figure 3. Live photograph of the adult male *Mimon cozumelae* (UVS-V-02059) collected at Wuarska, Colón.

Danny Ordoñez, Marcio Martínez leg., 1 adult male, UVS-V-02059 (Fig. 3) • Río Plátano Biosphere Reserve, El Limón; 15°22′39″N, 085°11′45″W; 310 m elev.; 18 Sept. 2018; Hefer Daniel Ávila-Palma, Danny Ordoñez, Marcio Martínez leg.; 1 adult male.

Both individuals were captured between 18:25 and 18:40 h, while the moon phase was first quarter with illumination between 42.9 and 62.1% of moonlight. There was drizzling rain when these bats were captured. Neither individual presented evidence of reproductive activity. We recorded ectoparasites only on the individual from El Limón, which was captured in an area within the very humid subtropical forest in which platanillos (*Heliconia* sp.; Fig. 2) were abundant. The specimen from Wuarska was captured in a ravine emerging from a cave (approximately 15 m above) surrounded by forest and ending in the Río Plátano. This specimen vocalized while it was being taken out from the mist net and attracted other bats (some individuals of *C. perspicillata* were caught during these calls). These distress calls are emitted by bats under the physical stress of being caught by a predator and, similarly, when constrained in a trap or by an experimenter, and the attraction of other bats may help to escape by distracting or frightening the predator (Russ et al. 2004; Eckenweber and Knörnschild 2016).

Identification. Both individuals have spatulated upper inner incisors (pointed in *M. bennettii*), dark brown dorsal pelage (brown-reddish in *M. bennettii*), and white wingtips (dark in *M. bennettii*). The collected specimen presented a narrow talonid on the third lower molar (larger in *M. bennettii*), V-shaped posterior edge of the palate (U-shaped in *M. bennettii*), mandible length longer than 16.7 mm (shorter than 16.7 mm in *M. bennettii*), and second lower premolar (p4) enlarged with a posterior cingulum (reduced posterior cingulum in *M. bennettii*) (Simmons and Voss 1998; but see Gregorin et al. 2008).

External measurements (in mm) are as follows (for UVS-V-02059 and the released individual, respectively): FA = 54.46, 55.75; Tib = 23.06, 23.30; E = 29.40, 29.48; EW = 16.30, 17.90; Th = 5.25, 6.45; LN = 19.71, 20.05; Tr = 9.25, 10.03; TrW = 3.21, 3.21; Ca = 18.11, 18.13; T = 16.52, 18.05; BH = 64.25, 69.22; HF = 12.95, 13.3; 3mt = 46.09, 46.31; 3ph = 16.32, 16.55; 2ph = 25.86, 26.33; 1ph = 18.35, 20.07; body mass = 23.0, 23.0 g. For the skull of the specimen UVS-V-02059, we obtained the following data: CBL = 25.91; ZB = 13.24; HB = 8.32; MB = 10.92; WUM = 9.75; CM^3 = 7.27; LR = 5.39; LP = 10.34; LUC = 3.86; CC = 7.34; HM = 2.22; LLC = 4.25; LM = 17.43; CM_3 = 9.81; HC1 = 7.02; HC2 = 6.27; HC3 = 6.74.

Discussion

Valdez and LaVal (1971) provided the first record of *M. cozumelae* for Honduras based on three specimens (two males and one female) collected in Lancetilla, northern region of the country (Fig. 1). Mensural data reported

by these authors [FA (55.6, 56.4 mm), third metacarpal (47.8, 48.5 mm), and body mass (21.5, 22.9 g)], the only ones available for Honduran specimens, are slightly lower to those we present here. McCarthy et al. (1993) mentioned two more localities for *M. cozumelae*, both in northeastern Honduras: Aguacates, Colón, where two specimens were collected, and Catacamas, Olancho, where four specimens were obtained. Subsequently, Dick (2013) mentioned records of bat flies in individuals captured in 2001. These individuals represent the most recent captures of *M. cozumelae* in Honduras, and the reported locality (Lancetilla) maybe the same cited by Valdez and LaVal (1971) for the first specimens available for the country. There are two more citations of *M. cozumelae* for Honduras (Rodríguez Herrera and Sánchez 2015; Mora et al. 2018), but no reference to capture records or voucher specimens were reported.

The new records of *M. cozumelae* at two sites in Colón represent, therefore, the fifth and sixth localities of this species in Honduras, and the first record since 2001. They also represent a range extension of 60 km from the nearest record in Aguacates, Colón, and 90 km from the records mentioned by McCarthy et al. (1993) in Catacamas, Olancho. Additionally, the records reported herein are the first ones in the core of the RPBR, which is the largest and most important protected area in Honduras—it is part of the Mesoamerican Biological Corridor and part of our worldwide heritage (Medina-Fitoria and Turcios-Casco 2019). Areas embraced by this conservation unit have been sampled since the mid 1900s (e.g. Goodwin 1942; Benshoof et al. 1984), but no record of *M. cozumelae* was obtained until 1971. Recently, Medina-Fitoria and Turcios-Casco (2019) surveyed bats in Ciudad Blanca, La Mosquitia, also in the core of the RPBR, and found that 16.6% of the 30 species recorded are indicators of well-conserved areas. In Nicaragua, where it is also a rare species, known only by a single record obtained in 2013 from the Indio Maíz Biological Reserve in the southeastern part of the country (Medina-Fitoria 2014; Medina-Fitoria et al. 2015).

Currently, 11 bat species are recognized as threatened in Honduras, including eight phyllostomids (Hernández 2015). Deforestation is a major threat to these species and is mainly associated with extensive cattle raising (Hernández 2015, Turcios-Casco et al. 2019). In La Mosquitia region (including the RPBR), for example, illegal cattle ranching is responsible for more than 90% of the forest degradation (Larsen 2019). About 10 years ago in Wuarska, there was intense deforestation by non-native people, but in this case, they were growing their crops, in addition to raising livestock. Considering the rarity of *M. cozumelae* in Honduras and its association with primary forests, as recorded in Guatemala (Kraker-Castañeda et al. 2016), we suggest the inclusion of this species in the conservation and management plan of the RPBR and a reevaluation of its conservation status at the national level. In Costa Rica, *M. cozumelae* is also known from only of a few records and is treated as a threatened species (Rodríguez Herrera et al. 2015).

Acknowledgements

We want to dedicate this work to all the Miskitos, Tawahkas, and Pech that give their effort every day to protect the resources of the RPBR. We are grateful to the ICF, especially to Ángel Matute and Marco Espinoza for monitoring species that are important to the conservation of the RPBR, and for the authorization of research and collection of specimens in the study area. We thank to Alex Vallejo of Museum Biodiversidad y Ciencia in the Universidad Nacional Autónoma de Honduras located in the Sula Valley, who kindly took out the mensural measurements of the skull of the bat. We thank all the local people of the communities of Nueva Esperanza and Bonanza, Victor Hugo López, and Graviel Ríos for their effort during the surveys. We also thank Jean Kollantai of the TSU Center for Academic Writing, and Marcelo Nogueira, Natali Hurtado, Timothy Divoll, and José Mora for improving this manuscript. We want to dedicate this work to Dilcia Teresa Mazier Casaña, who now rests in peace and was a motivation and inspiration for all of us.

Authors' Contributions

HDAP and MATC conducted ecological and morphological analysis; MM conceived and coordinated the survey of the record; DO and DIOM made the distribution map. All the authors were involved in the writing, edition, and improvement the manuscript.

References

Arroyo-Cabrales J, Miller B, Reid F, Cuarón AD, de Grammont PC (2015) *Mimon cozumelae*. The IUCN Red List of threatened species, Gland, 7 pp. https://doi.org/10.2305/iucn.uk.2015-4.rlts.t136561a21991024.en. Accessed on 2019-02-04.

Benshoof L, Yates TL, Froehlich JW (1984) Noteworthy records of mammals from eastern Honduras. The Southwestern Naturalist 29 (4): 511–514. https://doi.org/10.2307/3671014

Ceballos G (2014) Mammals of Mexico. Johns Hopkins University Press, Baltimore, 984 pp.

Dick CW (2013) Review of the bat flies of Honduras, Central America (Diptera: Streblidae). Journal of Parasitology Research 2013: 1–17. https://doi.org/10.1155/2013/437696

Dietz C, Helversen O von (2005) Illustrated identification key to the bats of Europe. https://auvergne-rhone-alpes.lpo.fr/images/chiroptere/telecharger/dietz_von_helversen_2004_1.pdf. Accessed on 2019-12-04.

Eckenweber M, Knörnschild M (2016) Responsiveness to conspecific distress calls is influenced by day-roost proximity in bats (*Saccopteryx bilineata*). Royal Society Open Science 3 (5): 1–8. https://doi.org/10.1098/rsos.160151

Escuela Nacional de Ciencias Forestales (2013) Plan de manejo Reserva del Hombre y la Biosfera del Río Plátano (2013–2025). Asociación Internacional de Fomento (AIF) y Instituto Nacional de Conservación y Desarrollo Forestal, Áreas Protegidas y Vida Silvestre (ICF), Comayagüela, M.D.C., 252 pp.

Gardner AL (2008). Mammals of South America marsupials, xenar-

thrans, shrews, and bats. The University of Chicago Press, Chicago and London, 669 pp.

Giannini NP, Kalko EKV (2004) Trophic structure in a large assemblage of phyllostomid bats in Panama. Oikos 105 (2): 209–220. https://doi.org/10.1111/j.0030-1299.2004.12690.x

Giménez AL, Giannini NP (2016) Morphofunctional segregation in molossid bats (Chiroptera: Molossidae) from the South American southern cone. Hystrix, the Italian Journal of Mammalogy 27 (2): 1–11. https://doi.org/10.4404/hystrix-27.2-11467

Goodwin GG (1942) Mammals of Honduras. Bulletin of the American Museum of Natural History 79 (2): 107–195.

Gregorin R, Capusso GL, Furtado VR (2008) Geographic distribution and morphological variation in *Mimon bennettii* (Chiroptera, Phyllostomidae). Iheringia, Série Zoologia 98 (3): 404–411. https://doi.org/10.1590/s0073-47212008000300017

Hernández DJ (2015) Programa para la conservación de los murciélagos de Honduras (PCMH). In: Rodríguez Herrera B, Sánchez R (Eds) Estrategia centroamericana para la conservación de los murciélagos. Universidad de Costa Rica, San José, 41–55.

Holdridge LR (1967) Life zone ecology. Tropical Science Center, San José, 206 pp.

Hoppe JP, Ditchfield AD (2015) Range extension of *Mimon bennettii* (Chiroptera: Phyllostomidae) in Brazil with comments on its systematics. Mammalia 80 (4): 469–473. https://doi.org/10.1515/mammalia-2015-0045

Hurtado N, Arias E, Pacheco V (2014) Redescription of *Mimon koepckeae* (Chiroptera: Phyllostomidae). Zoología 31 (4): 377–388. https://doi.org/10.1590/S1984-46702014000400009

Hurtado N, Pacheco V (2014) Análisis filogenético del género *Mimon* Gray, 1847 (Mammalia, Chiroptera, Phyllostomidae) con la descripción de un nuevo género. Therya 5 (3): 751–791. https://doi.org/10.12933/therya-14-230

Kraker-Castañeda C, Pérez SG, Cajas-Castillo JO, Echeverría-Tello JL (2016) Lista actualizada de los murciélagos (Mammalia, Chiroptera) de Guatemala. Revista Mexicana de Biodiversidad 87: 409–416. https://doi.org/10.1016/j.rmb.2015.10.005

Kunz TH, Kurta A (1988) Capture methods and holding devices. In: Kunz TH (Ed.) Ecological and behavioral methods for the study of bats. Smithsonian Institution Press, Washington, DC, 1–28.

Larsen T (2019). A Rapid Biological Assessment of Ciudad del Jaguar, Ciudad Blanca, La Mosquitia, Honduras. RAP Bulletin of Biological Assessment 72, Conservation International, Arlington, Virginia, 216 pp.

Lobova, TA, Geiselman CK, Mori SA (2009) Seed dispersal by bats in the Neotropics. The New York Botanical Garden, New York, 473 pp.

McCarthy TJ, Davis WD, Hill JE, Jones Jr JK, Cruz GA (1993) Bat (Mammalia: Chiroptera) records, early collectors, and faunal lists for northern Central America. Annals of Carnegie Museum 62 (3): 191–228.

Martínez M (2014) Plan de investigación y monitoreo de la Reserva del Hombre y la Biosfera del Río Plátano (2014–2025). Instituto Nacional de Conservación y Desarrollo Forestal, Áreas Protegidas y Vida Silvestre (ICF), Proyecto USAID ProParque, Comayagüela, 79 pp.

Medina-Fitoria A (2014) Murciélagos de Nicaragua, guía de campo. Ministerio del Ambiente y los Recursos Naturales (MARENA), Managua, 278 pp.

Medina-Fitoria A, Saldaña O, Martínez JG, Aguirre Y, Silva W, Cháves M, Salazar M, Carballo N, Jarquín O, González RA, Díaz L, Chambers C, Reid F, Mies R, Williams K, Zolotoff JM, Molina C, Pérez T, Rodríguez J, Gutiérrez L, Fernández M, Mendieta R, Pérez J (2015) Nuevos reportes sobre los murciélagos (Mammalia: Chiroptera) de Nicaragua, América Central, con la adición de siete nuevos registros de especies. Mastozoología Neotropical 22 (1): 43–54.

Medina-Fitoria A, Turcios-Casco MA (2019) Micromamíferos (Mammalia: Chiroptera y Rodentia) de Ciudad Blanca, La Mosquitia, Honduras. In: Larsen TH (Ed.) Evaluación biológica rápida en Ciudad del Jaguar, Ciudad Blanca, La Mosquitia, Honduras. Conservation International, Arlington, 179–203.

Mora JM, López LI, Espinal MR, Marineros L, Ruedas LA (2018) Diversidad y conservación de los murciélagos de Honduras. Master Print S. de R.L., Tegucigalpa, 284 pp.

Ortega J, Arita HT (1997) *Mimon bennettii*. Mammalian Species 549: 1–4. https://doi.org/10.2307/3504246

Reid FA (2009) A field guide to the mammals of Central America and southeast Mexico, 2nd edition. Oxford University Press, New York, 384 pp.

Rodríguez Herrera B, Sánchez R (2015) Estrategia centroamericana para la conservación de los murciélagos. Universidad de Costa Rica, San José, 85 pp.

Rodríguez Herrera B, Villalobos-Chaves D, Cordero E, Arias A, Ramírez J, Sánchez R (2015) Programa para la conservación de murciélagos de Costa Rica (PCMCR). In: Rodríguez Herrera B, Sánchez R (Eds) Estrategia centroamericana para la conservación de los murciélagos. Universidad de Costa Rica, San José, 9–22.

Russ JM, Jones G, Mackie IJ, Racey PA (2004) Interspecific responses to distress calls in bats (Chiroptera: Vespertilionidae) a function for convergence in call design? Animal Behaviour 67: 1005–1014. https://doi.org/10.1016/j.anbehav.2003.09.003

Sikes RS, Thompson TA, Bryan JA (2019) American Society of Mammalogists: raising the standards for ethical and appropriate oversight of wildlife research. Journal of Mammalogy 100 (3): 763–773. https://doi.org/10.1093/jmammal/gyz019

Simmons NB, Voss RS (1998) The mammals of Paracou, French Guiana: a Neotropical lowland rainforest fauna, part 1, bats. Bulletin of the American Museum of Natural History 237: 1–219.

Srinivasulu C, Racey PA, Mistry S. 2010. A key to the bats (Mammalia: Chiroptera) of South Asia. Journal of Threatened Taxa 2 (7): 1001–1076. https://doi.org/10.11609/JoTT.o2352.1001-76

Straube FC, Bianconi GV (2002) Sobre a grandeza e a unidade utilizada para estimar esforço de captura com utilização de redes-de-neblina. Chiroptera Neotropical 8 (1–2): 150–152.

Turcios-Casco M, Medina-Fitoria (2019) Occurrence of *Hylonycteris underwoodi* (Chiroptera, Phyllostomidae) and *Thyroptera tricolor* (Chiroptera, Thyropteridae) in Honduras. Studies on Neotropical Fauna and Environment 54 (1): 69–72. https://doi.org/10.1080/01650521.2018.1544205

Turcios-Casco MA, Mazier DIO, Orellana JAS, Ávila-Palma HD, Trejo EJO (2019) Two caves in western Honduras are important for bat conservation: first checklist of bats in Santa Bárbara. Subterranean Biology. 30: 41–55. https://doi.org/10.3897/subtbiol.30.35420

Valdez R, LaVal RK (1971) Records of bats from Honduras and Nicaragua. Journal of Mammalogy 52 (1): 247–250. https://doi.org/10.2307/1378465

Van Den Bussche RA, Baker RJ, Wichman HA, Hamilton MJ (1993) Molecular phylogenetics of Stenodermatini bat genera: congruence of data from nuclear and mitochondrial DNA. Molecular Biology and Evolution 10: 944–959. https://10.1093/oxfordjournals.molbev.a040060

Whitaker Jr JO, Findley JS (1980) Foods eaten by some bats from Costa Rica and Panama. Journal of Mammalogy 61 (3): 540–544. https://doi.org/10.2307/1379850

Williams SL, Genoways HH (2008) Subfamily Phyllostominae Gray, 1825. In: Gardner AL (Ed) Mammals of South America, volume 1, marsupials, xenarthrans, shrews, and bats. The University of Chicago Press, Chicago, 255–299.

Winkelmann JR (1962) Additional records of *Mimon cozumelae*. Journal of Mammalogy 43 (1): 112. https://doi.org/10.1093/jmammal/43.1.112